

## ATMOSPHERIC ELECTRICITY.

## AURORAS.

No extended auroral displays occurred during June; although reported on numerous dates the displays were not specially brilliant or widely observed.

The following are descriptions of the more important auroras of the month:

Albany, N. Y., 3d: an auroral light was observed at 10.05 p. m., consisting of an arch and "merry dancers," extending to altitude 40°, and from azimuth 135° to 250°; the display ended at 10.40 p. m.

Northfield, Vt., 9th: an auroral light was observed at 8.45 p. m., consisting of streamers rising to an altitude of 35° and extending over 60° of the horizon; the aurora was very brilliant at 9.30 p. m.; the display ended at 11 p. m. On the 20th an auroral arch was observed from 8.30 to 9.45 p. m., extending to altitude 25°, and covering 50° of the horizon; the display reached its maximum brilliancy at 9.30 p. m., after which it rapidly disappeared.

Duluth, Minn., 18th: auroral beams were visible at 10.20 p. m., and increased in brightness until 11.45 p. m., at which time an irregular arch was formed, near the centre of which a few streamers shot upward; the arch was poorly defined and lasted but a few minutes; the display ended at 1.30 a. m. on the 19th.

Port Huron, Mich., 26th: an auroral light was observed from 1.30 a. m. until daylight; it was again visible at 10 p. m., and continued until 2 a. m. of the 27th; the display extended to altitude 30° and over 90° of the horizon, and had the appearance of the break of day.

The voluntary observer at Egg Harbor City, N. J., reports having observed auroras on the following dates: 10th to 15th, 20th, 27th; only one of these displays was noted by other observers in New Jersey.

Auroras were noted on other dates, as follows:

1st and 3d.—Pekin, Ill.

5th.—Pekin, Ill.; Embarras, Wis.

9th.—Moorhead, Minn.; Ithaca, N. Y.

10th.—Escanaba, Mich.; Clayton, N. J.

11th.—Mount Washington, N. H.

14th.—Reidsville, N. C.

16th.—Parksburg, W. Va.

17th.—Alpena, Mich.

18th.—Fort Totten, Dak.

19th.—Mackinaw City, Mich.

21st.—Madison, Wis.

22d.—Fort Totten, Dak.

26th.—Erie and Wilkesbarre, Pa.

28th.—Pekin, Ill.

## THUNDER-STORMS.

Thunder-storms are reported to have occurred in the various states and territories on the several dates, as follows:

1st.—Alabama, Arizona, California, Florida, Georgia, Illinois, Indiana, Kansas, Louisiana, Maryland, Michigan, Nebraska, New Jersey, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Wisconsin, Wyoming.

2d.—Arkansas, California, Colorado, Connecticut, Dakota, Florida, Georgia, Indian Territory, Kansas, Louisiana, Maryland, Massachusetts, Missouri, Mississippi, New Hampshire, New Jersey, New York, New Mexico, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia.

3d.—Arkansas, Dakota, Florida, Georgia, Illinois, Indian Territory, Iowa, Kansas, Maine, Massachusetts, Mississippi, New Hampshire, New Mexico, North Carolina, South Carolina, Tennessee, Texas, Utah, Vermont, Washington Territory.

4th.—Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Indian Territory, Kansas, Kentucky, Louisiana, Michigan, Missouri, Mississippi, Montana, North Carolina, Ohio, South Carolina, Tennessee, Texas, Utah, Wisconsin, Wyoming.

5th.—Arkansas, Dakota, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Montana, New Jersey, New York, Ohio, Tennessee, Texas, Virginia, West Virginia.

6th.—Arkansas, Dakota, Georgia, Illinois, Indiana, Iowa, Indian Territory, Kansas, Kentucky, Louisiana, Michigan, Missouri, Montana, Nebraska, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, Virginia, West Virginia.

7th.—Arkansas, Dakota, Delaware, Florida, Illinois, Indiana, Iowa, Indian Territory, Kansas, Kentucky, Michigan, Missouri, Maryland, Mississippi, Minnesota, Nebraska, New Jersey, North Carolina, New Mexico, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, Wisconsin, Wyoming.

8th.—Arkansas, Colorado, Dakota, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Missouri, Mississippi, Montana, Nebraska, New Jersey, North Carolina, New York, New Mexico, Ohio, Pennsylvania, South Carolina, Texas, Virginia, West Virginia, Wisconsin.

9th.—Arkansas, Connecticut, Colorado, Dakota, Florida, Georgia, Illinois, Indiana, Iowa, Indian Territory, Idaho, Kansas, Kentucky, Louisiana, Montana, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Jersey, New Mexico, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Washington, West Virginia.

10th.—Arkansas, Colorado, Dakota, Florida, Indian Territory, Missouri, Mississippi, Montana, Nebraska, New Jersey, New York, North Carolina, Rhode Island, South Carolina, Texas, Tennessee, Wyoming.

11th.—Arkansas, California, Colorado, Dakota, Florida, Georgia, Iowa, Indian Territory, Kansas, Louisiana, Missouri, Mississippi, Montana, Nebraska, South Carolina, Texas, Tennessee, Washington.

12th.—Arkansas, California, Colorado, Dakota, Idaho, Iowa, Indian Territory, Kansas, Louisiana, Mississippi, Montana, Nebraska, Pennsylvania, Texas, Tennessee, Washington.

13th.—Colorado, Florida, Iowa, Indian Territory, Kansas, Montana, Nebraska, Texas, Wisconsin.

14th.—Colorado, Dakota, Florida, Iowa, Idaho, Montana, Minnesota, New Mexico, Ohio, Wyoming.

15th.—Dakota, Florida, Minnesota, Montana, New Mexico, Texas, Wyoming, Washington.

16th.—Dakota, Florida, Kansas, Michigan, Minnesota, New Hampshire, New York, Texas, Wisconsin.

17th.—Delaware, Florida, Illinois, Indian Territory, Montana, Maryland, Michigan, New Jersey, New York, Ohio, Pennsylvania, Wisconsin.

18th.—Arizona, Connecticut, Dakota, Florida, Indiana, Illinois, Iowa, Minnesota, Maryland, Massachusetts, Michigan, Nebraska, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Texas, Tennessee, Wisconsin.

19th.—Arizona, Colorado, Connecticut, Dakota, Florida, Georgia, Illinois, Indiana, Iowa, Maryland, Michigan, Minnesota, Nebraska, North Carolina, New York, New Jersey, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia.

20th.—Alabama, Arkansas, California, Colorado, Dakota, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Mississippi, Montana, Nebraska, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Texas, Tennessee, Virginia, West Virginia, Wisconsin.

21st.—Arkansas, Connecticut, California, Florida, Georgia, Illinois, Iowa, Kentucky, Louisiana, Missouri, Mississippi, Maryland, Maine, Michigan, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Vermont, Virginia, West Virginia.

22d.—Arizona, Colorado, California, Connecticut, Florida, Georgia, Idaho, Indiana, Michigan, Maine, Massachusetts,

Missouri, Maryland, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Oregon, Ohio, Pennsylvania, South Carolina, Vermont, Virginia.

23d.—Colorado, Florida, Indian Territory, Kansas, Massachusetts, Montana, New Hampshire, New Jersey, New York, South Carolina, Texas, Utah, Virginia.

24th.—Arkansas, California, Connecticut, Colorado, Dakota, Florida, Indian Territory, Kansas, New Jersey, Nevada, Pennsylvania, South Carolina, Texas.

25th.—Arizona, Colorado, Dakota, Florida, Indian Territory, Maine, Montana, North Carolina, South Carolina, Texas.

26th.—Arizona, Arkansas, Dakota, Florida, Georgia, Indian Territory, Louisiana, Missouri, Mississippi, New Mexico, New York, Pennsylvania, Texas, Wyoming.

27th.—Arizona, Arkansas, Colorado, Dakota, Florida, Georgia, Iowa, Louisiana, Mississippi, Minnesota, Nebraska, Pennsylvania, Tennessee, Texas, Wyoming.

28th.—Arizona, Colorado, Dakota, Florida, Kansas, Louisiana, Montana, Nebraska, New Mexico, Pennsylvania, Tennessee, Texas, Utah.

29th.—Arizona, Colorado, Dakota, Florida, Kansas, Louis-

iana, Minnesota, Montana, Missouri, New Mexico, Maine, Pennsylvania, Wyoming.

30th.—Arizona, Arkansas, Alabama, Colorado, Dakota, Florida, Illinois, Iowa, Kansas, Louisiana, Minnesota, Montana, Missouri, Michigan, Massachusetts, Maine, Nebraska, Tennessee, Texas, Wisconsin, Wyoming.

#### ELECTRICAL PHENOMENON.

Pike's Peak, Colo.: during the prevalence of a sleet and thunder-storm on the 23d a hissing noise was heard about the iron joists around the station, and also about the anemometer. On going near the latter a strong electrical shock was felt, which caused a twitching of the muscles of the face and hands, and the hair of the head to stand on end. The cups of the anemometer seemed surrounded by an almost imperceptible cloud. By standing in any place where the building did not shelter from the wind, and by pointing a finger, would cause the same hissing sound to issue from the end of the finger and a current would be felt. The display was unaccompanied by light of any kind and could only be distinguished by the hissing noise and the sensation; it continued about fifteen minutes.

#### OPTICAL PHENOMENA.

##### HALOS.

1st-4th.—On the 1st solar and lunar halos were observed at a number of stations on the middle Atlantic coast and at scattering stations in the Gulf States, Ohio Valley, and Lake region; on the 2d lunar halos, only, were reported from the central Mississippi valley, middle, south Atlantic, and Gulf coasts, and at a few stations in the Missouri and Ohio valleys, west Gulf states, and southern plateau, while both solar and lunar halos were noted in the north Pacific coast region; on the 3d and 4th solar and lunar halos were reported from scattering stations from the Lake region southward to the Gulf coast. During this period the area of low pressure described as number ii passed from the central Ohio valley northward over the Lake region, Saint Lawrence Valley, and off the Atlantic coast, attended by cloudy and rainy weather in the districts named.

4-9th.—But a few stations reported halos during this period, and those were mostly in the districts east of the Mississippi; solar halos were, however, observed at several stations in California on the 7th.

10-11th.—On these dates halos, mostly solar, were observed in the upper lake region, upper Mississippi valley, northern plateau, and middle Pacific coast, while areas of low pressure existed in the central and northern Rocky Mountain districts, attended by cloudy or rainy weather.

12-13th.—On these dates cirrus and cirro-stratus clouds cov-

ered the Lake region and middle Atlantic states, and numerous solar halos were observed in these districts.

14-26th.—This period was comparatively free from halos; they were seldom observed, and only at scattering stations.

27-30th.—Cirrus and cirro-stratus clouds were observed from the Lake region and Ohio Valley eastward to the Atlantic coast on the 27th and 28th, and solar and lunar halos were noted at numerous stations in this region on these dates. On the 29th and 30th a few stations in the upper lake region and upper Mississippi valley reported solar and lunar halos.

The phases of the moon, Washington mean time, during June, as given in "The American Ephemeris and Nautical Almanac" for 1887, are as follows: New moon, 20th, 17 h. 44.6 m.; first quarter, May 29th, 12 h. 11.4 m.; full moon, 5th, 5 h. 29.9 m.; last quarter, 12th, 20 h. 26.6 m.; perigee, 1st, 18.2 h.; apogee, 13th, 18.9 h.

##### MIRAGE.

The following is from the "New York Times" of June 19th:

PALMYRA, N. Y., June 18th.—A fine mirage, the second that has appeared in two months, was seen here to day. Lake Ontario, which is sixteen miles distant, was plainly reflected on the sky; a steamer, large sailing vessels, and the waves were plainly visible.

Mirages were also reported to have been observed at the following places: Henry, Dak., 1st; Webster, Dak., 4th, 18th, 23d; Reidsville, N. C., 15th; Vineyard Haven, Mass., 19th, 25th.

#### MISCELLANEOUS PHENOMENA.

##### FOREST AND PRAIRIE FIRES.

Fort Stanton, N. Mex.: on the 1st fires were reported in the Sierra Blanco Mountains.

Grand Haven, Mich.: a forest fire broke out about one mile south of station on the 25th and spread with great rapidity over an area about two miles in length. Fences and fruit trees suffered serious damage, and several farms and orchards were threatened with destruction. Fires also occurred on the same date in the woods west-northwest of here. The fires continued on the 27th to the south and north of this place, and men were employed in digging trenches from the lake to the burning districts for the purpose of checking the progress of the flames. On the 30th the forest fires south of the station were under control.

Forest fires are also reported to have occurred as follows: Fort Apache, Ariz., 15th, and Linkville, Oregon, 27th to 30th.

##### INSECTS.

Wadena, Wadena Co., Minn., 3d: reports from Perham, Otter Tail Co., state that grasshoppers have made their appearance in large numbers in that vicinity and have destroyed vegetation to a great extent.

Davenport, Iowa, 3d: farmers report that the chinch bug is causing much damage to the barley fields in Scott and Clinton counties.

Raleigh, N. C., 5th: grasshoppers and flea bugs are reported as destructive to the tobacco plants in this part of the state.

Owatonna, Steele Co., Minn., 7th: the chinch bug has injured the crops in this county.

Dover, Del., 8th: the rose bug is causing much injury to fruit and grain in this vicinity. Vineyards and orchards are covered with myriads of these bugs, and they have also in-